Table 1

Layer		Thickness	Carrier concentration (cm^{-3})
p-$Al_{0.07}Ga_{0.93}N$ cladding layer	1 0 6	0.5μm	5×10^{17}
undoped $In_{0.1}Ga_{0.9}N/In_{0.02}Ga_{0.98}N$ triple quantum wells	1 0 5	well 4nm/barrier 4nm	
n-$Al_{0.07}Ga_{0.93}N$ cladding layer	1 0 4	1μm	5×10^{17}
n-GaN base layer	1 0 3	4μm	1×10^{18}
undoped AlN initial layer	1 0 2	380nm	
SiC substrate	1 0 1		

Table 2

	SiC substrate	overgrown AlN layer	poly-type matching	crystal quality	device performance
This invention	4H- a-face	4H- a-face	Yes	Excellent	Good
compared example	6H- a-face	2H- a-face	No	Poor	Bad

Table 3

Layer		Thickness	Carrier concentration (cm^{-3})
p-$Al_{0.07}Ga_{0.93}N$ cladding layer	1 2 0 7	0.5μm	5×10^{17}
undoped $In_{0.1}Ga_{0.9}N$/$In_{0.02}Ga_{0.98}N$ triple quantum wells 1 2 0 6		well 4nm/barrier 4nm	
n-$Al_{0.07}Ga_{0.93}N$ cladding layer	1 2 0 5	1μm	5×10^{17}
n-GaN base layer	1 2 0 4	4μm	1×10^{18}
n-GaN seed layer	1 2 0 3	1μm	1×10^{18}
undoped AlN initial layer	1 2 0 2	380nm	
SiC substrate	1 2 0 1		

Table 4

(a) on n-type 4H-SiC(11-20)

Layer	Thickness	Carrier concentration (cm^{-3})
p-$Al_{0.07}Ga_{0.93}$N cladding layer 1 3 0 4	0.5μm	5×10^{17}
undoped $In_{0.1}Ga_{0.9}$N/$In_{0.02}Ga_{0.98}$N triple quantum wells 1 3 0 3	well 4nm/barrier 4nm	
n-$Al_{0.07}Ga_{0.93}$N cladding layer 1 3 0 2	1μm	1×10^{18}
n-$Al_{0.5}Ga_{0.5}$N initial layer	380nm	1×10^{18}
SiC substrate 1 3 0 1		

(b) on p-type 4H-SiC(11-20)

Layer	Thickness	Carrier concentration (cm^{-3})
n-$Al_{0.07}Ga_{0.93}$N cladding layer 1 3 0 2	0.5μm	5×10^{17}
undoped $In_{0.1}Ga_{0.9}$N/$In_{0.02}Ga_{0.98}$N triple quantum wells 1 3 0 3	well 4nm/barrier 4nm	
p-$Al_{0.07}Ga_{0.93}$N cladding layer 1 3 0 4	1μm	1×10^{18}
p-$Al_{0.5}Ga_{0.5}$N initial layer	380nm	1×10^{18}
SiC substrate 1 3 0 9		

Table 5

(a) on n-type 4H-SiC(11-20)

Layer		Thickness	Carrier concentration (cm^{-3})
p-GaN contact layer	1 4 0 5	5nm	1×10^{18}
p-$Al_{0.25}Ga_{0.75}N$ cladding layer	1 4 0 4	0.5μm	5×10^{17}
undoped $In_{0.02Al0.15}Ga_{0.85}N/Al_{0.15}Ga_{0.85}N$ triple quantum wells	1 4 0 3	well 2nm/barrier 5nm	
n-$Al_{0.25}Ga_{0.75}N$ cladding layer	1 4 0 2	1μm	5×10^{17}
n-$Al_{0.5}Ga_{0.5}N$ initial layer		380nm	1×10^{18}
SiC substrate	1 4 0 1		

(b) on p-type 4H-SiC(11-20)

Layer		Thickness	Carrier concentration (cm^{-3})
n-$Al_{0.25}Ga_{0.75}N$ cladding layer	1 4 0 2	0.5μm	5×10^{17}
undoped $In_{0.02Al0.15}Ga_{0.85}N/Al_{0.15}Ga_{0.85}N$ triple quantum wells	1 4 0 3	well 2nm/barrier 5nm	
p-$Al_{0.25}Ga_{0.75}N$ cladding layer	1 4 0 4	1μm	5×10^{17}
p-$Al_{0.5}Ga_{0.5}N$ initial layer		380nm	1×10^{18}
SiC substrate	1 4 0 9		

Table 6

Layer		Thickness	Carrier concentration (cm^{-3})
n-$Al_{0.25}Ga_{0.73}N$ layer	1 5 0 5	15nm	2×10^{18}
undoped $Al_{0.25}Ga_{0.75}N$ layer	1 5 0 4	5nm	
undoped GaN layer	1 5 0 3	4μm	
undoped AlN initial layer	1 5 0 2	380nm	
SiC substrate	1 5 0 1		